CHAPTER 1.0

INTRODUCTION

The major floods of 1986 revealed the inadequacies of Sacramento's existing flood control system and the urgent need for an upgrade to provide protection appropriate for this major metropolitan area. As described in Section 1.4, "Background," which follows, significant work has been and will be accomplished to reduce the risk of flooding from the American River. This work is the product of agreements and partnerships between numerous agencies and organizations, notably the U.S. Army Corps of Engineers (Corps), the State of California Reclamation Board (Reclamation Board), the Sacramento Area Flood Control Agency (SAFCA), and the U.S. Bureau of Reclamation (Bureau). After this work is completed, in 2007, the Sacramento area will have its flood risk reduced to approximately a 1-in-164 chance in any given year. Although this protection will be substantial, the substantial loss of life and property that would result from uncontrolled American River flows justifies continued study and further improvements to Sacramento's flood control system.

The Lower American River flood plain has significant natural ecosystem assets that have become increasingly valued in California. The proximity of surface and subsurface river flows and water from tributary runoff provide opportunities to improve riparian woodlands, wetlands, and flood plain grasslands along the Lower American River.

This report explores alternatives for providing a comprehensive solution to the area's flood control problems and contributing to the restoration of the Lower American River. It documents both the plan formulation process used to identify and compare alternatives and the environmental effects of the alternatives. During plan formulation, a rationale was developed for creating alternatives; evaluating the alternatives; determining the Federal interest; and selecting a recommended plan, which includes cost sharing and other Federal and local cooperation. The plan formulation portion described in Chapter 4 supplements the 1991 American River Watershed Investigation Feasibility Report and the 1996 American River Watershed Project Supplemental Information Report (SIR).

1.1 Purpose and Need

1.1.1 Purpose

The Corps, the Reclamation Board, and SAFCA—the sponsors of the American River Watershed Long-Term Study—are seeking to plan, design, and implement a flood damage reduction project that would significantly decrease the risk of flooding along the main stem of the American River in the Sacramento area. The objective of the Reclamation Board and SAFCA is to reduce the risk of flooding to the maximum extent possible. This has been traditionally expressed as a minimum of being able to pass the 200-year flood with freeboard. The Corps' policy is to provide increased flood damage reduction consistent with applicable Federal planning principles and guidelines that focus on identifying and providing financial assistance for the plan that maximizes national economic development (known as the NED Plan)

while protecting the nation's environment. The NED Plan describes the maximum net economic benefits as determined by average annual flood damages avoided less average annual costs.

In addition to flood damage reduction, a primary mission of the Corps' Civil Work Program is ecosystem restoration. Ecosystem restoration is focused on returning natural areas or ecosystems to a close approximation of their conditions prior to disturbance or to less degraded, more natural conditions. Ecosystem restoration is formulated in accordance with the principles and guidelines for water and related land resources studies. A National Ecosystem Restoration (NER) Plan, which reflects the ecosystem restoration plan that maximizes benefits at the least cost, will be identified.

1.1.2 Need

The need for an increased level of flood protection arose in February 1986 when major storms in northern California caused record floodflows in the American River watershed. Outflows from Folsom Dam, together with high flows in the Sacramento River, caused the river stage to rise above the design freeboard, or safety margin, of levees protecting the city of Sacramento. This storm event was the largest documented storm of record. Emergency repair work was required at several locations along the Garden Highway and in the Pocket area of Sacramento. If these storms had lasted much longer, major sections of the levee likely would have failed, causing probable loss of human life and billions of dollars in damages.

In January 1997, extreme rainfall in the Upper American River watershed again revealed the need for increased flood protection. The high level of rainfall in the Sierra Nevada resulted in record flows in both the Sacramento and the San Joaquin Rivers. Several gaging stations used to measure the water level in streams and rivers recorded the largest precipitation peaks in the history of their operation. The effects of the 1986 and 1997 storms raised concerns over the adequacy of the existing flood control system, which led to a series of investigations of the need to provide additional protection for Sacramento.

1.2 Authorization

The basic authority for the overall study is the Flood Control Act of 1962 (Public Law [PL] 87-874), as follows:

> The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and floods aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities: Sacramento River Basin and streams in northern California draining into the Pacific Ocean for the purposes of developing, where feasible, multipurpose water resource projects, particularly those which would be eligible under the provisions of title III of Public Law 85-500.

Although this authorization applies to the overall study of the American River watershed, specific direction for the current effort is provided by Section 566 of the Water Resources Development Act (WRDA) of 1999 (PL 106-53):

> **SEC. 566. FOLSOM DAM AND RESERVOIR ADDITIONAL STORAGE AND ADDITIONAL FLOOD CONTROL STUDIES**.
>
> (a) FOLSOM FLOOD CONTROL STUDIES-
>
> (1) IN GENERAL- The Secretary, in consultation with the State of California and local water resources agencies, shall undertake a study of increasing surcharge flood control storage at the Folsom Dam and Reservoir.
>
> (2) LIMITATIONS- The study of the Folsom Dam and Reservoir undertaken under paragraph (1) shall assume that there is to be no increase in conservation storage at the Folsom Reservoir.
>
> (3) REPORT- Not later than March 1, 2000, the Secretary shall transmit to Congress a report on the results of the study under this subsection.
>
> (b) AMERICAN AND SACRAMENTO RIVERS FLOOD CONTROL STUDY-
>
> (1) IN GENERAL- The Secretary shall undertake a study of all levees on the American River and on the Sacramento River downstream and immediately upstream of the confluence of such Rivers to assess opportunities to increase potential flood protection through levee modifications.
>
> (2) DEADLINE FOR COMPLETION- Not later than March 1, 2000, the Secretary shall transmit to Congress a report on the results of the study undertaken under this subsection.

Corps headquarters provided the following guidance for implementing Section 566 through a memorandum dated January 18, 2000:

- Prepare a feasibility-level report that addresses increasing the surcharge flood control storage at Folsom Dam and Reservoir assuming no increase in conservation storage at Folsom Reservoir and

- Prepare a feasibility-level report that addresses all the levees on the American River and on the Sacramento River downstream of and immediately upstream of the confluence of such rivers to assess opportunities to increase flood protection through levee modifications.

- An interim report will be prepared to meet the Section 566 requirements for a report on March 1, 2000.

Thus, flood control alternatives considered in this study will focus on increasing Folsom Dam flood control storage, modifying Lower American River and downstream levees, and a combination of modifying Lower American River and downstream levees and increasing Folsom Dam storage.

1.3 Study Location

The city of Sacramento is located where the American River joins the Sacramento River. The American River watershed, or drainage basin, covers approximately 2,100 square miles northeast of Sacramento and includes portions of Placer, El Dorado, and Sacramento Counties (Plate 1-1). Runoff from this basin flows through Folsom Reservoir and passes through Sacramento in a channel controlled by a system of levees. Folsom Dam and Reservoir are part of the Federal Central Valley Project (CVP), one of California's major water delivery systems.

1.4 Background

In February 1986, major storms in northern California caused record floodflows in the American River basin. Water releases from Folsom Reservoir, together with high flows in the Sacramento River, caused water levels to rise above the design freeboard, or safety margin, of levees protecting the Sacramento area. Emergency repair work was required at several locations along the Garden Highway and in the Pocket area of Sacramento. Had these storms lasted much longer, major sections of levee likely would have failed, causing probable loss of life and billions of dollars in damages. The effects of the February 1986 storms raised concerns over the adequacy of the existing flood control system, which led to a series of investigations for the purpose of providing additional flood protection to the Sacramento area. Plate 1-2 displays the timeline of these investigations.

In 1991, the Corps, the Reclamation Board, and SAFCA completed the initial feasibility study for the main stem American River and the Natomas basin. (The Natomas basin is just north of downtown Sacramento, at the confluence of the American and Sacramento Rivers.) The purpose of that study was to define the flood risks to the Sacramento area, develop flood protection alternatives consistent with other water resource needs and opportunities in the study area, and recommend a plan for implementation. Many alternatives were evaluated in that study. The resulting plan, recommended in the 1991 feasibility report, was a flood detention dam just downstream of the confluence of the North and Middle Forks of the American River and levee improvements in the Natomas basin sufficient to control runoff from a storm with a 1-in-200 chance of occurring in any year.

Following completion of the feasibility report, Congress provided guidance relating to the American River study in Section 9159 of the Department of Defense Appropriations Act of 1993 (PL 102-396). This act authorized the construction of much of the work identified in the Natomas basin as described in the feasibility report. It also directed that additional studies be conducted to identify a project for increased flood protection along the American River. In response to congressional direction, the Corps and its local sponsors, the Reclamation Board and SAFCA, prepared the 1996 SIR to provide information in addition to that presented in the 1991 feasibility report. The SIR was a comprehensive analysis that reformulated measures and alternatives to increase flood protection for Sacramento. The report presented three candidate plans: Folsom Modification Plan, Folsom Stepped Release Plan, and the Detention Dam Plan. The Detention Dam Plan was the National Economic Development (NED) Plan.

In 1996, Congress considered the findings in the 1996 SIR and addressed the desires of local and regional interests. In the WRDA of 1996, Congress authorized the following elements of the plans recommended in the SIR.

- Levee modification along both banks of the Lower American River,
- Levee modification along the east bank of the Sacramento River downstream from the Natomas Cross Canal, and
- Installation of streamflow gages upstream from Folsom Reservoir and modification to a flood warning system along the Lower American River.

These flood control elements are known as "Common Features." Construction is presently underway to implement these project elements.

WRDA of 1996 also authorized continued interim reoperation of Folsom Reservoir to achieve variable flood control space.

In 1999, the Corps, SAFCA, and the Reclamation Board prepared an information paper that provided additional information on four plans that were identified by various interest groups to reduce the flood risks to Sacramento.

The four plans are as follows:

- Folsom Modification Plan – This plan primarily consists of increasing the release capacity of Folsom Dam by constructing five new river outlets below the existing auxiliary spillway, enlarging the eight existing river outlets, and modifying the existing stilling basin and increasing the operational flood control storage space in Folsom Reservoir. The plan also includes strengthening existing levees along the Lower American River.
- Folsom Stepped Release Plan – This plan consists of features similar to the Folsom Modification Plan, "stepping" the objective release from Folsom Dam during infrequent floods from 115,000 cubic feet per second (cfs) to 145,000 and 180,000 cfs.
- Folsom Enlargement Plan – This plan primarily includes raising the existing dam and dikes at Folsom 6½ feet, replacing all eight spillway gates and bridge across the top at the dam, enlarging the eight existing outlet works at Folsom, constructing five new outlets, and increasing the stability of existing levees along the Lower American River.
- Folsom Modification and Upstream Storage Plan – The principal feature of this plan is a flood detention dam 350 feet high on the North Fork American River, near Auburn. The plan also includes features similar to those of the Folsom Modification Plan.

Under Section 101 of WRDA of 1999, Congress authorized outlet modifications generally consistent with the SIR and the Folsom Dam Modification Plan described in the SAFCA Information Report entitled Next Step for Flood Control along the American River, prepared by SAFCA in March 1998. These modifications at Folsom Dam, which are being refined and designed by the Corps, are

- Enlarging existing river outlets,
- Modifying surcharge storage, and
- Prior to the above coming on-line, a water control manual will be completed that will address modifying the variable flood control space originally instituted by Folsom reoperation

Construction of these features is expected to be completed in 2008.

Section 101 of WRDA of 1999 also directed that the Folsom Dam Flood Management Plan be updated to take advantage of improved weather forecasting. Studies to update the flood management plan are underway.

Section 366 of WRDA of 1999 authorized modifications to the Common Features project authorized in WRDA of 1996. These modifications primarily consist of the additional strengthening and raising of levees along the American River and Natomas Cross Canal. Construction of these features is expected to be completed in 2003. Detailed design efforts are underway to implement Section 101 and Section 366 project features (Plate 1-2).

1.5 National Environmental Policy Act and California Environmental Quality Act

This report integrates plan formulation with documentation of environmental effects. This report is also a supplemental environmental impact statement/supplemental environmental impact report (SEIS/SEIR). The SEIS/SEIR is supplemental to the 1991 and 1996 studies. The SEIS satisfies the requirements of the National Environmental Policy Act of 1969, as amended (NEPA), and the SEIR satisfies the requirements of the California Environmental Quality Act (CEQA).

NEPA is the nation's charter for environmental protection. The act establishes policy, sets goals, and provides means for carrying out the policy. Section 102(2) of the act contains action-forcing provisions to make sure that Federal agencies act according to the letter and spirit of the act, including a provision to prepare a detailed statement—now called an EIS—on the effects of a proposed Federal action. The Federal regulations for implementing the procedural provisions of NEPA were published by the Council on Environmental Quality (CEQ) in the Code of Federal Regulations (CFR) as 40 CFR Parts 1500-1508 (43 Federal Register 55978-56007, November 29, 1978).

This report employs the concept of integration established in the CEQ's NEPA regulations. Integration is based on the CEQ provision to combine documents, which states that

"any environmental document in compliance with NEPA may be combined with any other agency document to reduce duplication and paperwork" (40 CFR 1506.4). The Corps regulations permit an EIS ("environmental document") to be either a self-standing document combined with and bound in a feasibility report ("agency document"), or an integration of NEPA-required discussions in the text of the report. To reduce paperwork and redundancies and to consolidate documentation into one consistent report, the Corps elected to integrate discussions that normally would appear in an EIS into the feasibility report. Sections in this integrated report that include NEPA-required discussions are marked with an asterisk in the table of contents to assist readers in identifying such material.

CEQA encourages the preparation of joint documents and the close cooperation of federal and state agencies involved with the same project (CEQA Guidelines Section 15222). This reduces duplication of effort between federal and state agencies. It is also consistent with the NEPA guidelines that also encourage federal agencies to work closely with state and local agencies.

CEQA also indicates that an EIR may be prepared as part of a project report and that the report sections required in an EIR be identified (CEQA Guidelines Section 15120). The Supplemental Plan Formulation Report/EIS/EIR meets these requirements. The sections of this report required under CEQA are identified in the Table of Contents.

1.6 Public Review of Draft Report

Public review of this report is part of the NEPA and CEQA processes. This draft report does not select or recommend a plan. Public comments from this review will be used by the local sponsors, SAFCA and the Reclamation Board, to identify a locally preferred plan. Comments will also be used to develop a final version of this report, which will recommend a plan for implementation. This draft report presents a summary of information developed to date on existing conditions and future conditions with and without the project; flood control and ecosystem restoration problems and opportunities; a description of the alternative formulation process; and a description and comparison of the alternatives, including their effects.

1.7 Public Concerns

1.7.1 Public Scoping

Background

The process of determining the scope, focus, and content of an EIS/EIR is known as scoping. The scoping process assists the lead agencies in determining the substantive issues to be addressed in an EIS/EIR. The purposes of scoping are to help identify the range of actions, alternatives, and environmental effects to be evaluated in depth in the EIS/EIR; bring together interested governmental agencies, project sponsors, and other interested parties to discuss and help resolve concerns; and eliminate from further study those issues that are not important to the decisionmaking process.

This section provides an overview of the scoping process the American River Watershed Project Long-Term Evaluation and the SEIS/SEIR. A scoping report included in Attachment 2 of Appendix A provides more detail on the scoping process and the outcome of that process.

Tools used during scoping include the notice of intent (NOI), prepared by the Federal lead agency; the notice of preparation (NOP), prepared by the State lead agency; scoping meetings; and early consultation with governmental agencies and the public.

Notice of Intent and Notice of Preparation

The Corps published an NOI to prepare a supplemental EIS/EIR on the American River Watershed Project in August 2000. The Reclamation Board prepared and issued an NOP to prepare a supplemental EIS/EIR on September 21, 2000. The publication of the NOP began the formal scoping period, which ended on October 20, 2000. During the scoping period, the Corps and the Reclamation Board conducted scoping meetings and received written comments from agencies and the public.

Scoping Meetings

The Corps, the Reclamation Board, and SAFCA held three public scoping meetings in October 2000. The meetings were held in Folsom, Sacramento, and Woodland, California. To publicize the meetings, the Corps mailed approximately 2,000 meeting notices to interested parties throughout the study region and across the State. In addition, a news release was prepared and forwarded to the local news media.

The scoping meetings were conducted in an open house format. Participants were provided a self-guided view of exhibits describing the flood control history of the Lower American River and the alternatives to be evaluated in the SEIS/SEIR. Attendees were encouraged to talk with representatives of the Corps, the Reclamation Board, and SAFCA. A court reporter was available at each meeting to record oral comments. Three meeting attendees made oral comments at the scoping meetings. Attachment 2 of Appendix A includes the transcripts of those comments.

Before the formal public meetings, SAFCA facilitated additional scoping by organizing a series of meetings with affected parties and interested agencies. At these meetings, SAFCA encouraged comments and participation from the public. The Corps, Reclamation, and SAFCA also will address these comments in the supplemental EIS/EIR.

Written Comments

Sixteen comment letters were received by the end of the formal CEQA scoping period, on October 20, 2000. The comment letters are included in Attachment 2 of Appendix A.

Comment Summary

As a result of the scoping process for the supplemental EIS/EIR, the following topics were determined to require evaluation to assess potentially significant effects:

- Land use and agriculture
- Transportation and circulation
- Air quality
- Flood protection alternatives
- Water quality
- Water supply
- Levee improvements
- Flood control and flood risk
- Wildlife habitat
- Wetlands and aquatic ecosystems
- Recreation
- Environmental justice and
- Cultural resources

1.7.2 Participants and Coordination

Preparation of this report was accomplished with the close coordination and collaboration of the two local sponsors, the Reclamation Board and SAFCA, and the Bureau, which owns and operates Folsom Dam and Reservoir. The study is being coordinated with the U.S. Fish and Wildlife Service (the Service) and National Marine Fisheries Service (NMFS) to ensure compliance with Federal environmental laws and regulations and with the State of California Division of Safety of Dams to ensure dam safety compliance.

The Reclamation Board is expected to be the nonfederal sponsor for flood control. SAFCA is expected to be the Reclamation Board's local sponsor for flood control and is the tentative nonfederal sponsor for ecosystem restoration. Both sponsors continue to support this long-term study. In addition, they both:

- Judge that the Sacramento area flood risk will remain unacceptably high, even after the currently authorized American River flood control improvements are completed

- Believe that for them to select a locally preferred plan for flood control, the scope of this study needs to be expanded somewhat beyond the alternatives requested in Section 566 of WRDA of 1999 (accordingly, this study examines an advance release alternative that would augment advance release already authorized in WRDA of 1999 as part of the flood management plan update)

- Support ecosystem restoration in the Lower American River floodway and support its inclusion in this study; SAFCA has indicated an interest in participating as the Nonfederal sponsor for ecosystem restoration

1.8 Related Studies and Reports

1.8.1 American River Water Resources Investigation

The purpose of the American River Water Resources Investigation (ARWRI) was to identify unmet water-related resources needs in the Bureau's American River service area, to formulate alternative plans to meet those needs, and to select a preferred and implementable alternative. Issues that were addressed included water supply, water quality, fisheries, recreation, and power production. The American River service area includes most of the American River drainage basin; parts of the lower Sacramento River below its confluence with the American River; and a portion of the Delta, primarily in San Joaquin County.

1.8.2 Wild and Scenic Rivers Studies

As part of its ARWRI, the Bureau was required to evaluate portions of the North and Middle Forks of the American River to determine their eligibility for National Wild and Scenic Rivers System (NWSRS) status. The results of those evaluations were presented in the report "Technical Team's Inventory and Recommendation for Wild and Scenic River Eligibility and Preliminary Classification," dated September 14, 1992.

An interagency team evaluated 23 miles of the Middle Fork (from Oxbow Dam to the confluence with the North Fork) and a total of 21 miles of two separate reaches of the North Fork (from the Colfax-Iowa Hill Bridge to the upper end of Lake Clementine and from North Fork Dam to the intake of the Auburn Dam diversion tunnel). The team concluded that each segment was "eligible" for further study and that each was unique in several ways and contained at least one "outstandingly remarkable" value. The next phase of the investigation, to determine the suitability of each segment for NWSRS status, was conducted as part of the Bureau's ARWRI.

1.8.3 Folsom Flood Management Plan

Section 9159 of the 1993 Defense Appropriations Act directed the Secretaries of the Army and Interior to jointly develop and implement a flood management plan for the American River and Folsom Dam that would ensure prompt, reliable, and full use of the flood control capability at Folsom Dam. The Bureau and the Corps cooperated in preparing the plan. The plan's objectives are to maximize the flood control capability within the 400,000-acre-foot flood reservation of Folsom Reservoir and to improve the streamgage network and flood forecast system for the upper American River basin. In addition, the plan recognizes that reservoir releases need to be made as quickly as possible in anticipation of incoming flow and in accordance with the existing water control manual.

The plan recommends features and operational changes to

- Increase the allowable rate of increase in Folsom Dam outflow from 15,000 cfs in a 2-hour period to 30,000 cfs in a 2-hour period

- Implement a 4-hour response time in which to begin actions to match reservoir outflows to inflows

- Improve the existing downstream flood-warning system

- Install telemetered streamflow gages; automate flood control gates at Folsom and Nimbus Dams

- Modify the river outlets at Folsom Dam to allow their full use in combination with spillway releases

1.8.4 Folsom Dam Safety Study

The Bureau is determining the extent of Folsom Dam's safety deficiency. As discussed in Section 2.1.1, Folsom Dam cannot pass the full probable maximum flood (PMF). The study will determine the risk and consequences of dam failure due to PMF overtopping the dam, and will develop a corrective dam safety plan.

1.8.5 Draft Swainson's Hawk and Giant Garter Snake Habitat Conservation Plan (1992)

This draft report was prepared by SAFCA in compliance with the California Endangered Species Act. The principal goal of the plan was to create a legal framework to ensure that the local agencies controlling land use in the Natomas and Meadowview areas of Sacramento would exercise their authorities in a manner that would avoid jeopardizing the continued existence of the Swainson's hawk and giant garter snake as a result of urban growth. The report was not made final and was superceded by the "Natomas Basin Habitat Conservation Plan for Sacramento and Sutter Counties, California."

1.8.6 Folsom Dam and Reservoir Reoperation, Operation Plan and EIS (1992)

The Folsom Dam and Reservoir Reoperation Operation Plan presents the results of studies intended to identify the effects and costs of providing greater flood protection to portions of the Sacramento metropolitan area by increasing the seasonal flood control space in Folsom Reservoir. The report was based on an interim (10-year) reoperation of the reservoir to increase its flood space to 590,000 acre-feet, thus providing protection from a 100-year storm as defined by FEMA.

1.8.7 Final Environmental Impact Report for the Revised Natomas Area Flood Control Improvement Project (1993)

This report discusses alternatives designed to provide as much flood protection as possible to the Natomas area and portions of the lower Dry and Arcade Creek basins independent of any improvements that may subsequently be implemented along the main stem of the American River. Changes to the Natomas levee work recommended in the December 1991 feasibility report on the American River Watershed Investigation and authorized by the 1993 Defense Appropriations Act are described in the report. The levee and related improvements constructed around and adjacent to the Natomas basin are intended to provide residents and property owners protection from runoff from a 100-year storm.

1.8.8 SAFCA Folsom Dam Improvements with Minimized Reservoir Drawdowns – Reconnaissance Evaluations (November 1994)

Two prospective ways for improving the flood control capability of Folsom Dam and Reservoir were examined: installing supplemental low-level outlets to increase the dam's release capacity during the early stage of a flood and raising the dam to increase the volume of flood control storage available. Designs and cost estimates were developed for these proposals. How well the proposals met targeted objectives also was analyzed.

1.8.9 Revised Natomas Basin Habitat Conservation Plan: Sacramento and Sutter Counties, California (1995)

The purpose of the Natomas Basin Habitat Conservation Plan is to mitigate for the loss of existing habitat to anticipated urban development and to reduce the potential for losses of the giant garter snake from operation of the water supply and drainage system. The goal of the habitat conservation plan was to acquire, control, preserve, restore, and enhance habitat values of the Natomas basin while allowing urban development to proceed according to local land use plans.

1.8.10 American River Watershed Project, California, Part I: Main Report, Part II: Final Supplemental Environmental Impact Statement/Environmental Impact Report (1996)

As mentioned in Section 1.4, "Background," in response to congressional direction in 1993, the Corps and its local sponsors, the Reclamation Board and SAFCA, prepared the SIR to provide information in addition to that presented in the 1991 feasibility report. The SIR was a comprehensive feasibility level study. The SIR presented three final candidate plans: the Folsom Modification Plan, the Folsom Stepped Release Plan, and the Detention Dam Plan.

The Detention Dam Plan primarily involved constructing a 508-foot-high flood detention dam on the North Fork American River to create a detention capacity of 894,000 acre-feet. This alternative would reduce the probability of flooding to less than approximately a 1-in-500 chance in any year. It would provide the highest level of flood protection practical to the Sacramento area and was the NED Plan.

1.8.11 Sacramento and San Joaquin Rivers Comprehensive Study

In response to extensive flooding and damages experienced in 1997, Congress authorized the Corps to provide a comprehensive analysis of the Sacramento and San Joaquin River basin flood management systems and to partner with the State of California to develop a master plan for flood management into the next century. In March 1999, the Corps and the Reclamation Board completed Phase I of the study, which focused on evaluating current conditions through a postflood assessment, developing hydrologic and hydraulic modes, establishing a mission statement, identifying flooding and related environmental problems, formulating preliminary planning objectives, initiating a public involvement program, collecting potential solution measures, and developing a plan of action for Phase II.

Phase II is underway and is concentrating on fully implementing the public involvement program, conducting feasibility-level assessments, developing basin master plans, and developing a programmatic EIS/EIR to support implementation. The final report of the comprehensive study will be a programmatic document and will include a recommendation for programmatic authorization of the implementation of the master plans so that implementation funds can be scheduled consistent with fiscal resources and other constraints.

1.8.12 SAFCA Folsom Dam Modification Report New Outlets Plan (Revision 1) (March 1998)

The SAFCA Folsom Dam Modification Report New Outlets Plan presents a Folsom Dam modification alternative designed to increase low-level outlet capacity. The modification consists of adding new outlet facilities but avoids taking existing facilities out of operation. It also avoids major traffic effects. Design, performance, and cost data are presented.

1.8.13 SAFCA Information Report: Next Step for Flood Control along the American River (1998)

This SAFCA information report presents three American River flood control plans: the Folsom Dam Modification Plan, the Folsom Dam and Levee Modification Plan, and the Auburn Detention Dam Plan. The Folsom Dam Modification Plan consists of modifications to the dam, which include lowering the main spillway, enlarging the eight existing low-level outlets, replacing the five main and three auxiliary spillway gates, and strengthening the cores of Mormon Island Dam and two wing dikes. The maximum space required under the variable storage space operation at Folsom would be reduced from 670,000 to 600,000 acre-feet.

The Folsom Dam and Levee Modification Plan involves making recreational and environmental improvements in the lower reach of the American River Parkway; raising and strengthening the existing American River levees; modifying the Howe Avenue, Guy West, and Union Pacific Railroad bridges; modifying drainage facilities that discharge to the river; widening the Sacramento Weir and Bypass; and raising and strengthening levees in the Yolo Bypass. This plan involves raising the design capacity of the American River channel from 115,000 to 180,000 cfs.

The Auburn Detention Dam Plan, a flood detention dam capable of storing up to 894,000 acre-feet of floodwater, would be constructed at the confluence of the North and Middle Forks of the American River, near Auburn.

In addition, the document presents a new, less costly alternative to outlet modifications. This new outlet plan consists of adding five new outlets in the emergency spillway and enlarging the stilling basin.

1.8.14 Auburn Cofferdam Reconstruction Appraisal Study (1999)

In March 1999, the Bureau completed the Auburn Cofferdam Reconstruction Appraisal Study, which presented the results of appraisal-level designs and estimates for construction of a minimum-cost, "dry" dam at the site of the original Auburn Cofferdam on the North Fork of the American River. The dam would provide 180,000 acre-feet of flood storage and would be able to withstand overtopping during large flood events.

1.8.15 American River Watershed, California Information Paper (1999)

This information paper provides information in addition to that presented in the March 1996 SIR on the American River Watershed Investigation. It presents a description of significant changes in baseline conditions since completion of the SIR and implementation of several flood control features in the Sacramento area. The report includes descriptions and evaluations of four supplemental improvement plans (additional to those in the SIR) identified by various interest groups to reduce the flood risks to Sacramento. These alternative plans are described in Section 1.4, "Background."

1.8.16 Final Program Environmental Impact Report on Flood Control Improvements along the Mainstem of the American River (2000)

This program EIR evaluates the effects associated with constructing and operating the flood control elements proposed at the time of the study to be part of a financing district. The proposed actions described in this report include reoperating Folsom Reservoir on a long-term basis, modifying Folsom Dam's outlet works, equalizing levee heights along the Lower American River, making improvements to the mouth of Mayhew Drain, and increasing conveyance capacity to the South Sacramento Streams Group.

1.8.17 Folsom Dam Bridge Appraisal Report (2000)

The Bureau prepared the Folsom Dam Bridge Appraisal Report, which addresses the need for a permanent new bridge to remove traffic from the Folsom Dam roadway. Current use of the dam as a public thoroughfare causes public safety and security problems and makes some operation and maintenance (O&M) tasks less efficient and more hazardous. The Bureau has determined that a new permanent bridge downstream of Folsom Dam would provide improved safety and security at the dam, more efficient O&M, and a safer roadway. A potential alignment for a new permanent bridge is presented. The estimated cost of the new bridge is approximately $42 million; however, there is currently no authorization or funding to construct a new permanent bridge.

1.8.18 Additional Information, Folsom Dam Flood Control Storage Downstream Levees (2000)

This report is intended to provide additional information on two of the flood damage reduction plans under investigation to reduce the risk of flooding to Sacramento. The report includes background information on flood problems and potential solutions in the Sacramento area; includes additional information, including costs and benefits, for the Modified Stepped Release Plan and the Folsom Enlargement Plan; and describes potential future actions for implementing a project to achieve a higher level of flood protection for the Sacramento area. The report was prepared in response to congressional direction in Section 566 of the WRDA of 1999.

1.8.19 Streambank Protection for the Lower American River – Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project

This document is a supplemental EIS and EIR and is tiered to the original EIS for the Sacramento River Bank Protection Project (SRBPP) and to Supplements I-IV, prepared by the Corps or jointly by the Corps and the Reclamation Board. Supplemental EIS IV set forth a programmatic approach to future project assessment under NEPA and disclosed several unavoidable consequences of methods of bank protection authorized by the SRBPP. This document broadens the programmatic approach through direct extension to the American River and its unique resources, problems, and public issues. The primary intent of this document is to provide a framework for the focusing of future environmental issues relevant to the lower American River. In addition, this document provided site-specific review of three proposed bank protection projects (construction completed in 2000).

1.9 Report Organization

This report has been organized to present information regarding the planning process, project alternatives, and potential impacts. It is intended to meet NEPA and CEQA requirements for assessing potential adverse impacts on the environment, as well as Corps project reevaluation guidelines. Important NEPA and CEQA terms are presented in Table 1-1.

The document has been divided into 10 primary chapters (Chapters 2.0 through 11.0), each dealing with a specific subject area relating to the project components, alternatives, and the planning process. In addition, a detailed impact analysis for each resource under evaluation is included as Attachment 1 of Appendix A.

1.9.1 Chapter 1.0, “Introduction”

Chapter 1.0 provides background information concerning the purpose of and need for the American River Long-Term Study, project authorizations, and project status, as well as the scope and intent of the document. It highlights agency and public concerns expressed during the planning process and notes linkages with other related studies and reports.

TABLE 1-1. Important NEPA and CEQA Terms
This table lists terms that are used under NEPA and CEQA.

NEPA	CEQA
Cooperating agency	Responsible agency
Proposed action	Proposed project
No-action alternative	No-project alternative
Environmentally preferred alternative	Environmentally superior alternative
Purpose and need	Project objectives
Affected environment	Environmental setting
Environmental impact statement (EIS)	Environmental impact report (EIR)
Notice of intent (NOI)	Notice of preparation (NOP)
Notice of availability (NOA)	Notice of completion (NOC)
Record of decision (ROD)	Findings

1.9.2 Chapter 2.0, "Affected Environment"

Chapter 2.0 provides a detailed presentation of the existing environmental conditions in the project area. It includes a discussion of existing conditions with respect to current facilities, projects, and plans. The chapter also includes a complete discussion of environmental resources that would be affected by implementation of project alternatives.

1.9.3 Chapter 3.0, "Problems and Opportunities"

Chapter 3.0 provides an evaluation of the current constraints, level of risk, and opportunities that are to be addressed by this long-term study. In doing so, it identifies the existing flood risk with current improvements, current system inadequacies, flood characteristics, and the current goals for reducing flood risk in Sacramento.

1.9.4 Chapter 4.0, "Plan Formulation and Screening of Flood Damage Reduction Measures"

Chapter 4.0 describes the Corps' planning process with respect to the selection of candidate plans for detailed analysis. The chapter explains the criteria applied to the alternative screening process and explains the rationale and methodology behind selection of alternatives for detailed evaluation. Correspondingly, a discussion is provided for why alternatives or prospective flood damage reduction measures were eliminated from further consideration.

1.9.5 Chapter 5.0, "Flood Control Alternatives"

Chapter 5.0 presents a description of the plan components, accomplishments, design, operations, and environmental effects of the seven candidate plans addressed in this study.

These plans are included in one of the following categories: (1) no action, (2) Folsom Dam raise, and (3) enhanced conveyance.

1.9.6 Chapter 6.0, "Ecosystem Restoration for Flood Plain and Fisheries Resources"

Chapter 6.0 describes the environmental restoration plan formulation component of the American River long-term study. Opportunities for restoration along the Lower American River are explained, and specific descriptions of potential restoration sites are identified. The chapter also provides a discussion of the restoration measures, alternative plans, and incremental analysis of alternatives for selected sites.

1.9.7 Chapter 7.0, "Environmental Effects and Mitigation"

Chapter 7.0 presents a detailed description of the environmental setting, methods, and assumptions used in the effects analysis; the construction- and operation-related environmental effects; and the associated mitigation.

1.9.8 Chapter 8.0 "Evaluation and Comparison of Flood Control Alternatives"

Chapter 8.0 describes the environmental mitigation developed for each alternative, based on the environmental evaluation of Chapter 7.0. Cost estimates and an economic evaluation are presented for each alternative. The economics and performance of alternatives are compared.

1.9.9 Chapter 9.0, "Cumulative and Growth-Inducing Effects and Other Required Disclosures"

Chapter 9.0 addresses other requirements directly and indirectly related to the study, including analysis of cumulative and growth-inducing effects; compliance with other applicable laws, policies, and plans; and other coordination and consultation requirements.

1.9.10 Chapter 10.0, "Plan Selection and Implementation"

Chapter 10.0 describes the necessary steps leading to plan selection and implementation. The chapter identifies the estimated project timeline for future actions, defines commitments and responsibilities, and verifies the fulfillment of procedural notice and review requirements and final alternative selection criteria.

1.9.11 Chapter 11.0, "Conclusions"

This chapter is a list of conclusions to date, reached by the long-term study.

1.9.12 Chapter 12.0, "Document Recipients"

This chapter identifies the agencies, organizations, and persons that were sent copies of the draft supplemental plan formulation report/EIS/EIR.

1.9.13 Chapter 13.0, "List of Preparers"

Chapter 13.0 presents a list of individuals and organizations that contributed to the preparation of the report.

1.9.14 Chapter 14.0, "References"

Chapter 14.0 identifies references, including studies, reports, analyses, and other reference materials, used in preparation of this report.

1.9.15 Index

The index presents key words for the report and indicates where the reader can find them addressed in the document.

1.9.16 Glossary

The glossary presents an alphabetical listing of important terms, phrases, and acronyms with their definitions to aid the reader in understanding the document.

1.9.17 List of Acronyms and Abbreviations

A page providing definitions of acronyms and other abbreviations used in the main report (Volume I) is provided at the end of the document.

1.9.18 Appendix A, "Environmental"

Appendix A is divided into attachments that contain technical information and supporting information used in the environmental analysis. This appendix also includes the scoping report, Coordination Act Report, Biological Data Report, and ecosystem restoration report.

1.9.19 Appendix B, "Economics"

Appendix B reports risk and uncertainty output and with- and without-project flood damages and with-project benefits.

1.9.20 Appendix C, " Engineering"

Appendix C presents the geotechnical, civil, structural, and electrical and mechanical basis of design. It also describes various hydraulic analyses accomplished for the study. The hydrology discussion describes basin hydrology, reservoir simulation methodology, and the flood risk analysis. The appendix also provides detailed cost estimates for the alternatives.

1.9.21 Appendix D, "Real Estate"

Appendix D provides information regarding the real estate requirements associated with each alternative under consideration.